MISCELLANEOUS.

Circular Saws.

We hereby present two interesting communications on Circular Saws; they will close the subject, at least for the present. We are much obliged to our friends for their kindness.

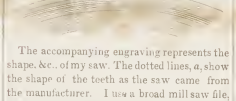
MESSRS. EDITORS—Having been for the last fifteen years more or less engaged in the running circular saws, I cheerfully give the result of my experience and observation. In the first place it is necessary that the saw be true on the face, and of an even thickness; the shaft or arbor should be so fitted up as to have no play or movement endwise. For a saw of twenty inches or upwards, the points of the teeth should be at least three inches apart. File them with a 6 inch, three-squared file, as being the most economical; file the front of the teeth in such a manner as that, should the line be extended across the saw, it would form a segment of one quarter the circle of the saw; file square across, and make the length of the tooth equal to one side of the file, which will be long enough for any sized saw; set the teeth just enough to have the saw clear itself in the timber, and be very careful that both sides are set alike or equal. But above all things, keep the teeth sharp pointed, for it is as impossible to make a circular saw run straight or free when it is dull, as it is to make a ripping handsaw run in that manner under the same circumstances; and a circular saw should always be kept as sharp as a joiner keeps his ripping saw. When the above directions have been followed, I have never known a saw to heat, or run out of a straight line, when fed by machinery, or steadily by hand, unless the timber sprung so as to close up to and press against it, in which case great care is necessary to save it from heating. The most of the heated saws that have fallen under my observation (and they are many) have been injured by careless or injudicious feeding.

In making the above observations, I have taken it for granted that any one undertaking the care of a circular saw, would keep the teeth all of a length, or the saw perfectly round or circular. C.

MESSRS EDITORS—When I read the inquiries of R. W. W., of Florida, in No. 12, Vol. 7, of the Scientific American, how to remedy the evils in running circular saws, and you called for information on the subject, I watched with deep interest the result. Hoping there would be that particular and practical information given which many hundreds now need, and without which they will experience a sea of trouble before they will overcome (if they ever do) the evils complained of by R. W. W. There are, no doubt, a few mechanics who have overcome nearly all evils in running circular saws, like Wm. Perkins, of North Carolina—and those are the men who should reveal their knowledge and experience to many who much need it, yet never will possess it unless communicated to them by some one. I have had constant experience in the running of circular saws of all sizes for twelve years; still, I must confess, it was not until very recently that I have been satisfied with the result of my own experiments and knowledge upon the use of circular saws. One year since I put a forty-four inch circular saw into a mill, on a fluctuating mountain stream, and have, within that time, sawed more than one million feet lumber from logs—a large proportion of it hard wood—and with a very unsteady supply of water.

I believe the use of circular saws to be yet in its infancy, and the time not far distant when several dozen of forty or 50 inch circular saws will be strung on one mandril, doing more and better work than five gangs of straight upright saws can do—(and nothing but the want of sufficient capital prevents me from seeing it demonstrated soon). There are many minute things which are important in order to do good work with circular saws. Some of the most important of them I believe to be the right number of teeth, of the right size and shape: the saw always to be kept perfectly round and sharp, with considerable set: th saw to be run at the right speed, and the carriage that feeds the log up to the saw to move with perfect accuracy. If I were to make a rule as the result of my experience, —which of course would be variable according to different circumstances—I should say that the teeth of large sized circular saws, for logs, should be four inches apart and staid forward, so that a line drawn with the front of the tooth would cut off one-third of the plate. A line should be drawn around the saw one and three-quarter inches from the edge, then cut away with the gummer all the plate to that line, leaving only the tooth of sufficient strength to retain the set, which ordinarily need not be heavier than the common upright saw tooth and similar in shape. The velocity of circular saws should be 4,000 feet per minute on the cutting edge, which would vary their revolutions, according to size, from 250 to 1 or 5000 per minute. The power required is in proportion to the labor performed, I use from 3 to 10 horse power. Experience has satisfied me that one of the greatest evils in running circular saws has been occasioned by the want of sufficient space between the teeth for the sawdust. And still there should be as great a number of teeth as possible, and at the same time leave the required space. It will be said that the more teeth in the saw the smaller the chip taked by each tooth under the same feed, hence there is not so much tendency to deviate and incline with the grain of the timber. I know of no reason but experience, why so much space is required between the teeth. Many have reduced the number of teeth in their saws, and at the same time let the blank between the teeth fill up, and all their former troubles have returned with two-fold severity.

I would advise any one purchasing large saws to order them 5-32 of an inch thick on the edge, and 1-4 at the centre ground with a true taper. A saw of good thickness will waste no more timber than a very thin one, it will run more perfect, and require less set.



The accompanying engraving represents the shape, &c., of my saw. The dotted lines, *a*, show the shape of the teeth as the saw came from the manufacturer. I use a broad mill saw file, and never file only the front and top of the tooth. I find many things in favor of this shape of tooth in the front. The shape of the tooth remains the same as it wears down; it is easier filed, and with more accuracy. It is a matter of no small economy in the saving of saws, from what it would be to bring the tooth to a small angle on the point, like the dotted lines, *b b*.

M. M. MANLY.

East Dorset, Vt.

Governor Hunt and Mechanical Trades in State Prisons.

"From a careful examination of the subject, I am convinced that the unfavorable results at the Clinton Prison may be attributed in part to the incomplete execution of the original plan, which included the necessary works for making iron and manufacturing it in some of its ruder forms. That part of the design has been neglected: no forges or furnaces have been erected, and the employment of prisoners has consisted in excavating and separating the ore—an operation which affords but little profit in the present condition of the iron market. The difficulty has been increased by the failure of ore on the land held by the State, making it necessary to pay a heavy rent for the privilege of working on an adjacent tract. A result much more favorable may be produced by erecting furnaces for smelting and manufacturing the ore on a scale sufficient for the employment of two or three times the present number of convicts. The additional expense of maintaining a larger number would be comparatively small. The labor of the convicts would be much more remunerative in the manufacture than the excavation of the ore. Other than financial considerations may be urged in favor of this policy.

Complaints continue to be made of the employment of too large a share of the convict labor in mechanical occupations, which conflict with the interests of honest citizens engaged in similar pursuits.

This evil, unavoidable to a certain extent, should be diminished as far as practicable. A leading motive in the establishment of the Clinton prison was to withdraw a large class of prisoners from mechanical employments. But that purpose has been only partially fulfilled. Aside from other inducements, I am of opinion that the management of all the prisons would be improved by transferring some of the convicts from Auburn and Sing Sing to Clinton. At Auburn the number of prisoners sometimes exceeds the number of cells. The increase of criminals consequent upon the growth of population and other causes, will soon produce the same result at Sing Sing. The evils produced by over-crowding the prisons beyond their regular capacity, are too serious to be tolerated. It cannot be doubted that the future necessities of the State will require a third prison. After making so large an expenditure upon the establishment at Clinton, its abandonment cannot be seriously entertained, and I would recommend that proper measures be taken for erecting such works as are necessary to carry the original design into full effect.

The number of convicts in the several State prisons on the first of December last, was as follows:—Sing Sing, 830; Auburn, 771; Clinton, 113; total, 1,714."—[Gov. Hunt's Message.

[The question of learning mechanical trades in our State Prisons was made the subject of peculiar agitation for a number of years, by the old Mechanics' Associations. The old "New York State Mechanic," published by Joel Munsel, Albany, N. Y., and conducted with ability, advocated the mechanic's cause. Their efforts were successful in getting a law passed, to prevent the learning of trades in State Prisons. This law, we have been told, is a dead letter. The Clinton County State Prison was designed by our friend Ransom Cook, who laid the plan and was Superintendent for some years. Had he still been in charge of it, it would no doubt have been in a more prosperous condition to-day. Interested parties, we are told, endeavored to destroy it. Governor Hunt, we see, takes up the subject again, and comes to speak of it in a spirit favorable to the views of its originators. The mechanics of this State have justly complained of State Prison competition. It is true the number of convicts in all the Prisons cannot affect the mechanical interests of the State much, but the morality of the question, is one which grates hard upon their consciences and affects their honor in the nicest point.

Treasurer's Report—Gold and Silver Currencies of the World.

By the Report of the Secretary we learn that the revenue last year, 1851, was $52,312,-978.87: surplus on hand, $6,604,544.49, total in Treasury $58,917,524.36. Expenditures, $48,-005,878.68: leaving a balance of $10,911,615,-68. It is estimated in the Report that on the first of July, 1853, there will be a balance in the U. S. Treasury of more than twenty million of dollars. This is a very different account of finances from those of all the nations of Europe with the exception of Britain. All those countries exhibit balance sheets of a greater outlay than income. The Report says that from information in possession of government, it is expected that one hundred millions of gold will be obtained from California for some years to come, Mr. Corwin sets forth the reasons why our silver coins command a premium of two per cent. We quote the extract entire in respect to the gold and silver coinage of different nations, as it is a matter of great interest to every citizen.

"The relation of gold to silver in the legal coinage of the United States, is as 15·988; in Great Britain as 14·288: and in France as 1 to 15·499. Thus if will be seen that one ounce in pure gold will, in the United States, be equal to that produced from the coinage of 15,988 ounces pure silver: in Great Britain it will be equal to that derived from only 14,288 ounces pure silver; and in France to 15,499 ounces. So soon, heretofore, as the state of our foreign commerce, as is now the case, requires an exportation of specie, it is obvious that our silver coin must be exported whilst it can be procured, till the demand for exportation is supplied.

From the operation of this law of commerce arises the present scarcity of our silver currency. At this time, though our silver coin commands a premium in exchange for gold, it is, notwithstanding, still found more advantageous for shipment abroad than gold. In consequence of the premium on silver, though the relative legal value between it and the latter is as 1 to 15·988, the real intrinsic market value is only about 1 to 15·675. A debtor, then who offers silver in payment must give it at the rate of 15·988 ounces in coin, by which he loses 313-thousandths of an ounce, for with 16,675 ounces he could purchase 1 ounce of gold, which latter would be a legal tender for the same debt. It is to be borne in mind, however, that though the relative value of coin in Great Britain is as 1 to 14·288 that is not the relative bullion value of the two metals, which is about 15·716, the silver coin of that country being about ten per cent. less in value than silver bullion of the same weight; that is to say, the silver coin of that kingdom will go ten per cent. farther in paying debts than an equal weight of pure silver bullion at the standard value. A difference so great in the value of the two species of coin has not, of course, been the result of either miscalculation or mistake, but was brought about by design, and with the same views which, it is believed, will render it necessary for us to adopt a similar plan, in order to retain and maintain a silver currency. The obvious policy of this sysfem was to secure the gold and silver coinage of Great Britain against the fluctuations arising from the relative value of gold and silver bullion there. In Great Britain 14·288 ounces of silver coin is equal in payment to 15·988 ounces in the United States, and 15·499 in France. It is very clear, then, that there is no inducement to export silver coin to either country from Great Britain.

Though the British government manufactures one hundred shillings in coin from bullion intrinsically worth only ninety shillings, it does not permit individuals to bring ninety shillings in bullion to the mint and receive in exchange one hundred shillings in coin; but on the contrary, the community is obliged to pay the par value of all the silver coin it requires. It must give £5 in gold or silver for one hundred shillings in coin. Coinage being a monopoly by the government, the latter can impose such terms as it deems necessary and advisable, and the public, within certain limits, will pay the government its own price for the benefit of the mint stamp.

In fixing, therefore, the proper relative value which should be established between our gold and silver coin, it should not be done with regard to the value of our coins in reference to foreign coin, but as to their intrinsic value, as bullion in foreign countries.

The relative value of our gold and silver coins is, as already stated, as 1 to 15·988; and the bullion value of our silver coin in England, is 15·716, being a difference of 272 thousandths, or nearly two per cent. It follows then, as a matter of course, that on all occasions where the course of our foreign trade requires heavy shipments abroad, our silver coin will be first sought after for that purpose, even at a premium; and consequently, will disappear from circulation, as it has already done to a very great extent.

There seems to be but one immediate and direct remedy for this evil, and that is the one which has already been adopted in Great Britain, of changing the relative value between gold and silver coin, by reducing the intrinsic value of the latter. The opinion of the officers of the mint (in which judicious persons, whose opinions are entitled to great weight, concur) is, that this change could be advantageously made, by making our dollar weigh three hundered and eighty-four grains, and the smaller coins in proportion; so that eight hundred ounces should be worth, by tale, exactly $1,000. The director of the mint, in a communication on the subject, says:—"If such a scale of weights were adopted, the relation of silver in such pieces to gold would be as 14·884 to 1; and if the present true relation or bullion value is about 15·675 to 1, the new proposed silver coin would be even valued by law about five per cent., a very small advance, and far less than in British silver or in the worn Spanish coin which now monopolizes our circulation.

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RAIL-ROAD NEWS.

What Railroads Do.

The Galena and Chicago Railroad has been extended thirty-five miles west of Chicago, penetrating a region solely agricultural, and which scarcely had an inhabitant before 1835. When the building of this railroad was commenced, it was supposed that it would yield little or nothing to the stockholders, till after its completion to Galena. But the experiment of a dozen miles of finished road, says the Ill. State Register, demonstrated that the calculations of the projectors were erroneous, and every successive mile constructed has made that demonstration more complete.

"When it was extended thirty-five miles west of Chicago, it paid fourten per cent. upon the cost; and the same income has been realized constantly as the road progressed to its present western termination, which it reached this month. Calculations for a certain amount of business between this time and the opening of navigation were made, and locomotives and cars were provided in accordance with these calculations, but it is ascertained that there is a great deal more business than the road can do, and that several more locomotives could find constant employment now, and through the winter season.

We mention these facts to show that railroads create business where little existed before, and that capitalists need not object to western railroad stock, simply because the lines are located in what is generally termed a wilderness country.

What has been said of the Chicago and Galena road may be said of every projected line in this State, and we shall find, that as they progress, business sufficient to support them and pay besides a handsome income to the owners, will spring up and extend, and speedily make our glorious State the gem and bright particular star of the Union."

City Railroads.

A grant was given by our late Common Council to certain parties to construct a railroad through Sixth Avenue, and they have set themselves resolutely to work for the advancement of the project. The company is now a joint stock one, and of course it cannot be held up as a monopoly. In a few years we will have quite a number of railroads running through our city for the accommodation of citizens going to and coming from their places of business. The difficulties which have attended the crossing of the North and East rivers this winter, will make a great many leave Brooklyn and Williamsburg to reside in New York In consequence of this, city railroads will become more necessary. Let the good work go on.

Explosions of Steam Boilers.

Two correspondents of the Syracuse Star recommend Congress to offer a reward for the best invention, to be produced in a given time, to prevent the explosion of steam boilers. The inventions are to be all tested by a competent commission at a given time and place.

MACHINE FOR MEASURING THE FLOW OF WATER.

Figure 1.

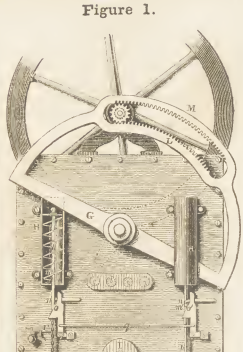
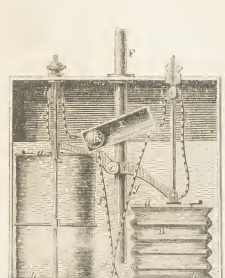


Figure 2.



This is rather a singular machine for measuring water or other fluids and deriving some mechanical power therefrom. It is the invention of Mr. Samuel Brown, an English engineer residing in Lambeth, Eng.

The improved fluid measurer is represented by figs. 1 and 2, fig. 1 representing a modification, for the purpose of obtaining motive power. Fig. 2 shows a transverse vertical section of the measuring apparatus. The measures or receptacles, into which the fluid is conveyed for measurement, consist of two flexible bags or vessels, A and B, kept distended by metal rings; these collapsible vessels are of some fluid-tight material, and capable of sustaining a considerable pressure; they are attached to discs, *a a*, and *b b*, at top and bottom—*b b* at the lower part being fixed, while the upper discs, *a a*, are free to move. The upper discs, *a a*, have joint pins supported in brackets, and take into the forked end of a lever, Y, which oscillates on a fixed centre, *c*. The under discs, *b b*, are united with a four-way cock, C the upper passage of which forms the inlet for the water, and the under one the delivery—the two side passages being connected by pipes *d d*, with the vessels, A and B. In the position shown, the vessel, A, is about to deliver its contents, and the vessel, B, again be refilled. Another oscillating cylinder, X, is provided, in which a globular weight is placed, having free motion to traverse from one end to the other, on the lever, Y, being canted. This cylinder is connected at each end by two chains, *e f*, and *g h*, the chain, *e*, is attached to one end of the lever, Y, and the chain, *h*, to the other end; while the chains, *f* and *g*, communicate with a drum on the axis of the four-way cock, C, in such manner that, on either of them being subjected to tension, the one will tend to turn the plug of the cock in the opposite direction to that caused by tension on the other. The water or other fluid as it leaves A, will cause the depression of the upper disc, *a*, which, by the tension created on the chain *e*, will gradually raise that end of the cylinder, X, a little beyond the horizontal position, when the ball, E, will roll to the opposite end of that cylinder and complete the oscillation. The period having arrived when the position of the plug of the cock, C, is to be reversed, the cylinder, X, at that time completes its oscillation, when the gravity of the ball, E, overcomes the friction of the cock, C, reversing the position of the plug, so as to change the inlet and outlet passages; the water will now be allowed to escape from the full vessel, B, and enter, A, which may have been more or less emptied. The reverse oscillation of the cylinder takes place when the necessary changes are repeated, and so on; the whole is continued so long as the supply and delivery are uninterrupted; F is the supply pipe, which simply delivers the water into the outer case. The registering apparatus is actuated by the axis of the lever, Y, which has affixed to it, on the outside of the case, as seen in fig. 1, a short beam, from opposite ends of which two palls take into the teeth of a ratchet, on the first axis of the train of registering apparatus. It will be observed that the rollers, *i i*, over which the chains, *e* and *h*, pass, are supported from brackets, the stems of which pass through the cover; these are furnished with screw nuts, by which they may be elevated or depressed. By raising or lowering these rollers, the chains, *e* and *h*, will be sooner or later brought to a state of tension, and consequently produce the oscillation of the cylinder Y, at an earlier or later period thereby suffering a greater or less quantity of fluid to escape from the vessels, A and B, and by which it may be adjusted to the registering apparatus.

Part of the invention consists in the adaptation of the apparatus last described to the development of motion. Some of the internal parts are omitted, and others substituted, which are placed on the outside of the case as shown in fig. 1. On the axis of a lever and segment G is fitted, which performs the oscillations as transmitted by the vessels A and B. The lever G, in oscillating, presses on a roller and piston, of which there are duplicates as represented. The piston is thereby depressed, which contracts the spring within the tube, H, and at the same time depressing the rod, *l*, until the pin, *m*, slips over a catch lever, *n*, and presses upon the incline, *o*. This incline is mounted upon a fulcrum, *p*, on which the several parts connected there will oscillate. By the contact of the pin, *m*, with the incline, *o*, that lever will be thrown backwards,—that is, towards the centre of the machine. This motion is transmitted by the rod, *q*, to a small corresponding lever, *o'*, which, therefore, performs a simultaneous movement, releasing the pin, *m'*, which it will be observed has been caught by the catch, *n'*. This pin, on being released, is thrown upwards with its rod and piston, by the expansion of the spring in the tube, H'.—the lever, G, being at the time in the opposite position to that shown. The rods, *l l*, are connected by chains to a drum, I, on the four-way tap, C, which is thereby caused to perform its oscillation. The levers, *o o'*, will be brought back to the vertical position by the weighted lever, and the pin, *m*, will now be caught by the catch, *n*, and retained until a like action of the pin, *m'*, on the rod, *l'*, releases it by contact with the incline, *n'*, consequent on the alternate descent. The power to be transmitted is supposed to be from a head of water, which, according to the height of the column, will exert greater or less force on the moving discs of the vessels, A and B, which pressure, by the influx and escape of the water from those vessels, will be transmitted to the lever and segment, G. The oscillatory motion of the lever, G, is transmitted to a rotary shaft, as follows:—Two sets of teeth, L and M, are formed on the segment, which take into two pinions placed loosely on the fly-wheel shaft,—the teeth being in different planes for that object. The pinions have spring-palls attached, which take into the teeth of ratchet wheels fixed to the shaft. The teeth of these ratchets are set in opposite directions, so that while one pinion is transmitting the motion of G, to the main shaft, the other pinion is revolving on the shaft in the reverse direction, and its pall slipping backwards over the teeth of its respective ratchet wheel.

Electric Telegraph in Hospitals.

The St. George Hospital, London, has an ingenious and novel application of the Electric Telegraph. It consists of a small dial, not more than a foot in diameter, with a hand which points to certain numbers on it. They refer to a printed scale over it, on which are the names of all the physicians and surgeons of the hospital; and it is intended by means of this wonderful agency to intimate the moment they arrive, that in case of danger to any patient they may be instantly seen. On the directions are also the hours for meals, the time at which the friends of the sick must leave, the time for operations, and every other matter desirable to be known in the wards where it is thus intimated. The dial is placed in the hall of the hospital, and as the message is to be sent, so the corresponding number is found on the direction-table, and the hand is turned to a corresponding one on the dial. This causes a bell to ring in each ward, which indicates that the nurses are to refer to the dial—for they are placed throughout the establishment—when they will find the same number pointed to as the one in the hall and by referring to the directions they at once see what the message is. This saves a vast deal of confusion in running up and down stairs, besides being more desirable for the patients, who will be exposed to much less noise. It is probable that this admirable plan will soon be adopted in all similar establishments, as well as prison.

Counterfeit Gold Coin.

Counterfeit quarter eagles are in circulation in Savannah. The piece is described as being composed of some hard metal which has the color and ring of silver, but is easily distinguished by its glossy brightness. It has been cast in a mould, and has the milled edge. It may be easily detected by the roundness of its imprint, and the oily feeling which it has when pressed between the fingers. It purports to be of the coinage of 1847.

Extraordinary Case of Mirage.

The steamship Arctic was seen in a cloud off Newport beach on Thursday last week. It was a case of mirage, as the steamship was distant about 60 miles from the place where she was seen. At that time a vapor was rising from the water.

We see it stated that a number of Americans for California, who purchased tickets from an agent of the steamer Brother Jonathan, have arrived at Panama and been refused a through passage.

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RAIL-ROAD NEWS.

Tunnel Under the Hudson River at Albany.

Mr. Higham, C. E., has published, in the Albany Evening Journal, his plan for making a tunnel under the Hudson River, at Albany, the cost of which he estimates will amount to $517,720. The following is an outline of the plan:—

Commence the tunnel at a considerable distance from the river with a descent of 150 feet per mile. It is to be made of a brick arch. The whole tunnel is to be made under the river by coffer dams, and sinking iron tubes to turn the arches in them. Across the channel part of the river it is proposed to dredge the river to its proper depth, and to sink wrought iron tubes in which the brick arches will be turned. The tubes are proposed to be built of boiler plates, made in such lengths as may be found practicable. The plates of the tube to be rivetted on ribs of T iron, to give them form and stiffness. The ends of the several lengths of tubes, as they are sunk, to have temporary bulkheads so that the arches through each section may be finished when the joining will be made, by throwing puddling materials on the outside of the tubes, and, when tight, taking out the bulkheads and turning the arches at the connections. The materials for the arches to be taken into the tube by pipes rising above the water.

The form proposed for the tunnel is two circles, connected together by a range of columns; the arches to be of brick, twenty-seven inches thick; the brick to be made for the purpose, of the proper shape; three courses of brick to form the depth of the arch. Where the arches join in the centre, on the columns, will be cast-iron girders. In the bottom of the arches, under the tracks, will be suitable drains to collect any leakage, and a pump at the lowest point (which will be near the pier) for drawing the water from the tunnel. The object of giving this form to the tunnel was to save height, and to lessen the grades entering into it.

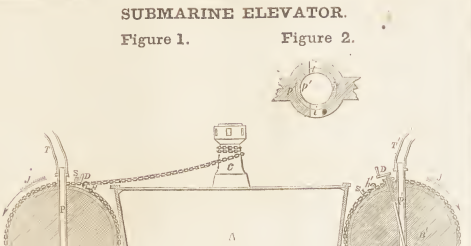
A chimney for ventilation (150 feet high) will be constructed on the pier, at which place will be the permanent draining-pump and the gas works for lighting the tunnel, and the several railroad companies' depots, shops, and grounds. A staircase will also be made on the pier and one on Quay street, to give access to foot passengers into the tunnel. A double track railroad will be made from East Albany to Quackenbush street, where they will connect with the tracks of the several roads leading into the general passenger depot proposed to be erected for all the railroads terminating at Albany, and the freight grounds of the Albany and Schenectady Railroad. In the tunnel will be a sidewalk, neatly railed in, for foot passengers.

If all this can be done for $600,000, it will be the greatest engineering feat ever performed in our country.

On Wednesday, last week, a collision occurred on the Harlem R.R.—3 persons injured.

SUBMARINE ELEVATOR.

Figure 1. Figure 2.



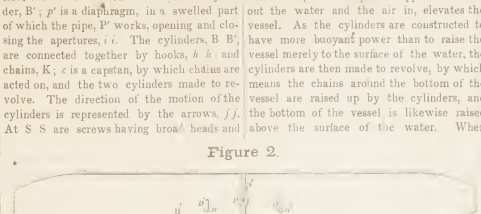
The accompanying engravings are views of the Submarine Elevator patented by the inventor, Mr. Orrillus T. Williams, of Smithland, Livingston Co., Ky., a few weeks ago.

Figure 1 is a cross section; figure 2 is a sectional view of the diaphragm and pipe for opening and closing the apertures: figure 3 is a plan view. The same letters refer to like parts.

A is a vessel intended to be raised: B and B' are cylinders; P is an injection pipe, and T is a flexible tube attached to it; D D are cranks turning valve rods, D' D', working with the screw stuffing boxes to open and close the valves as seen at O' O', in the cylinder, B'; p' is a diaphragm, in a swelled part of which the pipe, P' works, opening and closing the apertures, i i. The cylinders, B B', are connected together by hooks, h h' and chains, K; c is a capstan, by which chains are acted on, and the two cylinders made to revolve. The direction of the motion of the cylinders is represented by the arrows, j j. At S S are screws having broad heads and elastic washers capable of closing, air-tight two vents, the opening of which allow air to escape when the cylinders are to be sunk in the water.

The object of the invention is to raise vessels. The manner of using the apparatus is to sink the cylinders by the vessel, pass the chains beneath the bottom or through the sides as the case may be. This having been accomplished, air is forced through the flexible tubes, and the water in the cylinders, with which they were filled while sinking, is forced out through the apertures in the lower part of the cylinders. The buoyant force of the air—which is equal to the power applied to force out the water and the air in, elevates the vessel. As the cylinders are constructed to have more buoyant power than to raise the vessel merely to the surface of the water, the cylinders are then made to revolve, by which means the chains around the bottom of the vessel are raised up by the cylinders, and the bottom of the vessel is likewise raised above the surface of the water. When

Figure 2.



brought to the required position, it remains so, without liability to derangement. We have seen a certificate from members of the New York Board of Underwriters, that they believe the "Submarine Elevator of Mr. Williams will operate in a satisfactory manner, and they think favorably of its merits." This invention merits the attention of all interested in such matters. More information may be obtained by letteradressed to Mr. Williams.

Effect of Monotony on Health.

No man for any length of time can pursue one vocation or one train of thought without mental injury—nay, I will go further, without insanity. The constitution of the brain is such that it must have its time of repose. Periodicity is stamped upon it. Nor is it enough that it is awake and in action by day and in the silence of night obtains rest and repair; that same periodicity which belongs to it as a whole, belongs, too, to all its constituent parts. One portion of it cannot be called into incessant activity without a permanent injury ensuing. Its different regions, devoted to different functions, must have their separate times of rest. The excitement of one part must be coincident with a pause in the action of another. I do not think it possible for mental equilibrium to be maintained with one idea or one monotonous mode of life. There is a necessity for men of great intellectual endowments, whose minds are often strained to the utmost, to fall back on other pursuits; and thus it will always be that one seeks refuge in the pleasures of quiet country life, another in the chase, another in social amusements.—Nay, with all men, even those whose lot has been cast in a more lowly condition, whose hard destiny it is to spend their whole lives in pursuit of their daily bread, with one train of thought, one unvarying course of events, what would become of them if it were not for such a principle as this? Men often say that the pleasures of religion, and of a christian faith, are wholly prospective, and to be realized only in another world.

In this they make a mistake; for those consolations commence even here, and temper the bitterness of fate. The virtuous laborer, though he may be ground down with the oppressions of his social condition, is not without his relief; at the anvil, the loom, or even at the bottom of the mine, he is leading a double existence—the miseries of the body find a contrast in the calm of the soul—the warfare without is compensated by the peace within—the dark light of life here serves only to brighten the glories of the prospect beyond. Hope is the daughter of despair. And thus a kind Providence so over-rules events, that it matters not in what station we may be—wealthy or poor, intellectual or lowly—a refuge is always at hand, and the mind worn out with one thing turns to another, and its physical excitement is followed by physical repose.

Phosphate of Lime in Consumption.

When an account of Dr. Stone's (of New Orleans) success in treatment of consumption was published, it naturally enough interested the profession, as well as the friends of those who were suffering, because it raised a gleam of hope in cases where none existed. The following facts have come to our knowledge, and may be considered favorable in regard to this method of treatment. A gentleman of the neighboring city of Charlestown, whose son was considered in a hopeless state from the diseased condition of the respiratory apparatus, was induced to administer Dr. Stone's medicine. All the phosphate of lime procured at the shops appeared to be imperfectly prepared—being coarse and otherwise objectionable. A purer article was prepared especially for the occasion, reduced to an impalpable powder, and ten grains were administered three times a day, followed by a swallow of cod-liver oil. No material change was discoverable in the patient for two weeks. Suddenly, as it were a fixed pain of long standing in the chest then abated; sleep became refreshing the appetite improved, strength returned, and from being moved about the apartment reclining on an invalid chair, he is now daily riding on an average, ten miles on horse-back, facing the wind and breasting the cold with impunity. This is a synopsis of a case related by a grateful parent, who would be glad to have others, under similar circumstances, make an effort with the phosphate, combined with cod-liver oil.—[Boston Medical Journal.

Disease Propagated by Bank Notes.

A work, entitled History of Epidemic Cholera, has recently been published by Dr. T. H. Buckler, physician to the Baltimore Almshouse, in which he alludes to the propagation of disease by means of banknotes:—"The inmate of a small-pox hospital generally keeps what little money he may chance to have about his person. If he wants a lemon, he sends a note saturated with the poison, and having, perhaps, the very sea-sick odor of small-pox, to a confectioner, who takes it, of course. It would be impossible to conceive of any better mode of distributing the poison of a disease known to be so contagious and infectious. It could hardly be worse if so many rags were distributed from the clothing of small-pox patients.

By our Eastern papers we learn that the boot and shoe trade is very dull, and that the prices for labor have been greatly reduced. Many of the shoemakers, it is said, are making tracks for California.

MISCELLANEOUS.

Tanning. A New Book.

The "Art of Tanning, Currying, and Leather Dressing," by Campbell Morfitt, an able chemist, and published by Henry C. Baird, of Philadelphia, is a new book on a subject of great importance to tens of thousands in our country, for the leather interests of the United States are very extensive. There being no less than 6,233 tanneries in our country, employing 20,909 persons, and in which is invested no less than $18,900,557. With the exception of those excellent articles published in Vol. 5, Scientific American by one of the oldest, ablest, and best educated tanners in the United States, we have seen nothing published on tanning in our country which was of any consequence until now. This work is a translation from a celebrated French work, with such emendations and additions by Mr. Morfit as to render it a new book with all that is good belonging to the old one. It is adorned with a plate of Zadock Pratt, and a short biography of the ex-senator tanner.—There are older and perhaps more experienced tanners than he in our country, but none, we suppose, so fortunately wealthy. Some very excellent chapters are presented on the nature of tanning, the different substances employed; the qualities of different barks and a very excellent essay on the oaks of our country, of which there is a great variety. All the processes are explained and illustrated with 200 engravings, and the specifications of various patents for improvements are presented. No less than ten several patent accelerating processes (foreign and home inventions) are given, among which is that of Hibbard, published in Vol. 6, Scientific American. A great many other plans are also given, but that of Prof. Eaton, which has been highly praised, is not mentioned. The patent for it was granted at such a recent date, that information of the same could not have been obtained in time for publication.

In looking over this book, and reading the different plans for improving leather, and for reducing the time occupied in tanning a skin or hide, we are more and more convinced of the important fact that the tanning art has been greatly improved by modern discoveries and application—a contrary opinion to that held by the universal mass of the people. We know it is very difficult to introduce new plans of tanning, for tanners are like others wedded to old things; thus the rolling of leather—an operation now generally practised—was opposed with much bitterness by some of our most experienced tanners, one of whom said "he never would roll a hide while he lived," an assertion which he wisely lived either to forget or repudiate.

The whole science of tanning depends on two principles, one the removal of the hair from the skin, with the least injury to the gelatinous matter of which it is composed, and the other is the rendering of the skin insoluble in water, and to resist the action of the atmosphere, and yet be flexible. The hair can be removed by lime, sweating, and other means, but the employment of a substance or substances that will combine with the gelatine of the skin to form a new substance, insoluble in water and incapable of being injuriously acted upon by the atmosphere, offers a wide field for the historian of the tanning art, and presents a subject for the study of every tanner at least in our country. The art of tanning was known, we suppose, before the flood; it is practised among all nations, civilized and savage, and the gist of it lies in soaking the skins in different solutions of various vegetable substances of an astringent character until the tanning juices of those substances have combined with the whole skin and rendered it a new substance named leather. Oak and hemlock barks, sumac, willow, blackberries, catechu, kino, &c., are employed. Those who wish to get an account of the various processes and substances employed, must consult this book. We have only another remark to make, it is this, we have never known any of the metallic solutions to be employed in tanning, and from their nature, in rendering some vegetable substances insoluble, we believe that it would be worth the trouble for some of our tanners to make a few experiments. We would recommend the chloride of tin; it is made by feeding drop-tin into muriatic acid until effervescence ceases. The way to try it would be to make up a solution of it in a tub of cold water, until it stood about 1½° in the hydrometer; the skin should have undergone through the whole tanning process before it is placed in this solution, in which it should lie about two hours, and be stirred up two or three times. After this it should be well washed in cold water, and then finished in a milk-warm water bath, when it will be ready for drying. It is our opinion that a superior leather would be produced by this addition to any of the present processes.

Remarks about the Fair of the American Institute.

Owing to the great number and variety of articles exhibited at the Fair, and owing to the want of good classification and arrangement, we must have overlooked many good things in our notices of the articles exhibited. It could not be otherwise, for the articles are never arranged in classes because the place of exhibition has always been too small to allow of a good arrangement. One machine of one class stood at one corner, and another machine of the same class was to be found mixed up with a totally different group.

The Catalogue of the American Institute Fair has always exhibited an arrangement similar to that of a stone heap raised by a parcel of boys pitching the stones when sojourning home from school. The articles are not classified, nor does the catalogue afford the least clue to guide a visitor where to find such and such an article exhibited. We hope the managers of the Great Fair, next year, will have a good catalogue—an instructive one; they will find it a profitable speculation.

Banding Pulleys.—A most important improvement exhibited at the Fair was a circular and an upright saw for sawing scroll-work, driven by an improved method of Banding Pulleys, invented by R. W. Parker, who is now residing at 58 Dey street, this city, and for which a patent was granted on the 17th of last February. By the power of one man at the crank, a person is enabled to saw, with either saw, through a two-inch plank; the circular saw running at 2,600 revolutions per minute, and the scroll saw 600 vibrations per minute. This was done while the writer of this turned the crank. We consider this improvement to be a most valuable one, and applicable to all machinery. For portable machines, in small shops it is an improvement which must soon come into general use.

The improvement in this method of banding pulleys consists in arranging the driving pulley in reference to two other pulleys, that the band passing over these pulleys is not only pressed with any desired force against the periphery of the driver, but is also pinched between other pulleys operating upon the band as feed rollers.

Fine Arts.—In the fine arts, some of the most beautiful bronze castings we ever saw were exhibited, J. G. Gilbert, of 216 Pearl street being the agent. A gold medal was awarded for them. These castings were made by a new process of preparing the moulds. Flowers, animals, and other objects of nature can be copied exactly, and all their bounding lines of beauty, rendered permanent as the everlasting hills in metal.

Engraving on Steel.—A gold medal was awarded to A. H. Ritchie, of the firm of Bachia & Co., corner of Chamber and Centre street, N. Y., for a full length mezzotint steel engraving of the immortal Washington. It is the finest engraving, considering the attitude and the mass of light thrown upon the figure, we ever saw. The likeness is excellent and the whole composition of the picture is different from any other heretofore produced.

We have always endeavored to notice things strictly new, useful, and beautiful; but as we said before, amid such a confused mass, many excellent things have no doubt been overlooked. We would also state that a great defect, and one injurious to exhibitors at fairs, is the absence of a full description of the nature and action of the machines exhibited. A brief and clear description should be pasted up on every machine and apparatus. We hope the managers of the fair in the New York Crystal Palace, will attend to this hint, it will make the Fair far more interesting and instructive.

The New Crystal Palace at Sydenham, near London.

The last load of materials, the *debris* of the London Crystal Palace, were removed to their new site at Sydenham, on the first of this month. From all accounts the new Crystal Palace will exceed its predessor in its decorations and general arrangements. No expense appears to be spared in rendering it a model edifice—one of the grand sights of the world. M. Bonomi is occupied in arranging the specimens of Egyptian architecture, among which is a model of the rock-hewn temple of Abu-simbel, sphinxes, obelisks, and those strange paintings which abound in the tombs of ancient Thebes. The intention is to illustrate, by this means, the different epochs of Egyptian history. Models of the celebrated Ghibardi gates, and the principal figures from the Medici chapel at Florence, which latter are deemed the master-pieces of Michael Angelo, have been obtained by Messrs. Jones and Wyatt, who are travelling on the continent of Europe for the purpose of securing the *chef d'-œuvres* of art for the People's Palace. There is a similar activity and spirit exhibited about the grounds as in the erection of the building itself. Sir Joseph Paxton has ordered 50,000 scarlet geraniums to be supplied next spring, and the celebrated collection of palms, belonging to the Messrs. Loddiges, of Hackney, have been purchased by the Company. The steam engines have been ordered to work the water that is to adorn the palace and grounds, and already erect columns mark nearly the entire length of the building. The proprietors of the obelisks and blocks of marble and stone which stood outside the great Exhibition Building, have presented them to the Crystal Palace Company.

Scarcity of Silver Coin.

The same scarcity of silver coin that has so long prevailed in the United States, extends throughout the European Continent, as will be seen by the following paragraph from the London Times:—

There never was known for many years so great a scarcity of silver currency as at present, in consequence of the very large exportations of silver that have recently taken place to Port Philip, Melbourne, Geelong, Sydney, and other ports of Australian colonies for the convenience of the adventurers at the gold diggings. Not a vessel leaves the ports of London, Plymouth, Bristol, Liverpool, &c., but takes out a considerable amount of both gold and silver specie, either by speculators who are proceeding to the above colonies for the purpose of making large purchases of gold from the emigrants now working at the diggings, or consigned by capitalists and bullion dealers to their agents at Port Philip, &c., for the same specific purpose. It is with much difficulty that the bankers in the city and West End can obtain silver currency to any amount either at the Bank of England or at the Royal Mint, to accommodate their correspondents in different parts of the United Kingdom with silver change.

At Birmingham, Manchester, Liverpool, and other large commercial towns, the demand at the various banks for silver is so great that they are unable to supply parties with more than £100 to £200, as not only is a vast quantity being shipped off to Australia and India, but the demands for silver bullion and specie for France, Belgium, Holland, Hamburg and the Continent, are also very extensive.

In consequence of this immense call for silver, it appears that the authorities at the mint intend having a considerable sum coined into specie, and likewise gold currency of half sovereigns for the convenience of the emigrants, who are placed in great difficulties from the want of a small circulating medium in exchange for their gold.

The French Infernal Machine.

This machine, which has been submitted to the examination of the most competent men, is composed of two tubes of thick sheet iron about three inches in diameter, and about eleven inches in length. To these two barrels are attached 120 cases made of thick cardboard, of the form and length of the Roman candles used in fireworks. Each of the large barrels was charged with heads of nails and pieces of iron and lead, and each case contained a ball. A second machine, similar to the former, was in course of construction, of which the police has also obtained possession.

Minute Mechanism.

There is a cherry stone at the Salem, (Mass.) Museum, which contains one dozen silver spoons. The stone itself is of the ordinary size, but the spoons are so small that their shape and finish can only be well distinguished by the microscope. Here is the result of immense labor, for no decidedly useful purpose; and there are thousands of other objects in the world, fashioned by ingenuity, the value of which, in a utilitarian sense, may be quite as indifferent.

Dr. Oliver gives an account in his Philosophical Transactions, by-the-way, of a cherry stone, on which were carved one hundred and twenty-four heads, so distinctly that the naked eye could distinguish those belonging to popes and kings, by the mitres and crowns. It was bought in Prussia for $1,500, and thence conveyed to England, where it was considered an object of so much value, that its possession was disputed, and became the object of a suit in chancery. This stone Dr. O. saw in 1687.

In more remote times still, an account is given of an ivory chariot, constructed by Mermecides, which was so small that a fly could cover it with its wing; also a ship of the same material, which could be hidden with the wing of a bee.

Pliny, too, tells us that Homer's Iliad, which has fifty thousand verses, was written in so small a space as to be contained in a nut shell; while Elia mentions an artist who wrote a distich in letters of gold, and enclosed it in the rind of a kernel of corn. But the Harren MS. mentions a greater curiosity than any of the above, it being nothing more or less than the Bible written by one Petre Bales—a chancery clerk—in so small a book that it could be enclosed within the shell of an English walnut. D'Israeli gives an account of many other similar exploits to that of Bales.

There is a head of Charles II, in the library of St. John's College, Oxford, wholly composed of minute written characters, which, at a small distance resemble the lines of an engraving. The head and ruff are said to contain the book of Psalms, the Creed, and the Lord's Prayer. Again, in the British Museum, is a portrait of Queen Anne, not much bigger than the hand. On this drawing are a number of lines and scratches, which, it is asserted, include the entire contents of a thin folio.

Picture Frame.

A picture frame on improved principles has been lately invented by John Wood, of New York City, who has taken measures to secure a patent. The object of this improvement is to conceal from sight, when not used, a key, or sheet of paper, &c., explanatory of the picture. For this purpose the explanatory key is fixed behind the picture on a hollow cylinder, within which is coiled a spring, which latter is held from unwinding by a ratchet wheel, &c. The apparatus is fastened in such a manner on the back of the frame as to be concealed from view, the key only being visible when unrolled, which is effected by drawing a tassel attached to the end. When it is desired to wind the key up, a catch is detached from the ratchet wheel, and the spring, having no check, uncoils, thereby causing the cylinder to revolve and thus wind up the explanatory key or diagram.

Captain Land, of the American clipper ship Challenge, died of dysentery, at Whampoa, on the 26 July. Upon examining his body, several rusty nails were found in him, one of which had passed through the left lobe of his lungs. It is thought that he must have swallowed them when a boy.

It is the highest duty, privilege, and pleasure for the great man and the whole-souled woman to earn what they possess, to work their own way through life, to be the architect of their own fortunes.

All a Spaniard wants in this world is sunshine and garlick.

Scientific American.

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USEFUL RECIPES.

Chloride of Sodium (Common Salt) in Intermittent Fever.

The most elaborate and carefully prepared paper on this subject is from the pen of Dr. Lattemore, in a late number of the American Journal of Medical Sciences. In this essay Dr. L. details the method pursued by M. Piorry—his extreme tact in detecting enlargement of the spleen—his success in reducing this organ by the use of chloride of soda.—Most of the cases of intermittent fever met with in the Parisian Hospitals are of long standing and imported from Algiers. says Dr. L., and they are always accompanied with enlarged spleens and difficult to cure. "We witnessed," says this writer, "many of the experiments of M. Piorry, and in a great majority of cases the fever yielded to salt quite as readily as to the salts of quinia." M. Piorry's method of administering the chloride of soda is, to give half an ounce in a cup of thin soup during the apyrexia (intermission) and fasting. It generally agrees with the stomach; rarely purges or vomits. Three doses usually suffice to effect a cure.

Court Plaster.

To make this, black silk is strained and brushed over ten or twelve times with the following preparation:—Dissolve half an ounce of balsam of benzoin in six ounces of rectified spirits of wine, and in a separate vessel dissolve one ounce of isinglass in as little water as may be. Strain each solution, mix them, and let the mixture rest, so that any undissolved parts may subside; when the clear liquid is cold it will form a jelly, which must be warmed before it is applied to the silk. When the silk coated with it is quite dry, it must be finished off with a coat of a solution of four ounces of turpentine in six ounces of tincture of benzoin, to prevent its cracking.

Crayons.

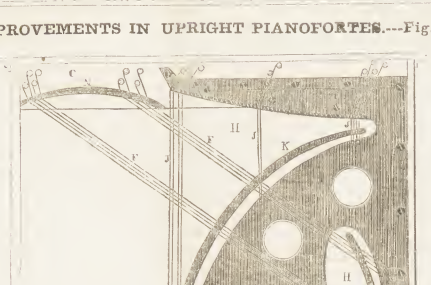
Colored cylinders used for drawing upon paper; they are usually made of a fine pipe-clay, colored with metallic pigments or carmine. Crayons containing plumbago are styled solid lead pencils.

CRAYONS, LITHOGRAPHIC.—Various formulæ have been given for the formation of these crayons. One of these prescribe, white wax four parts; hard tallow soap, shellac, of each two parts; lamp black one part. Another is, dried tallow soap and white wax, each six parts; lamp black one part. This mixture being fused with a gentle heat, is to be cast into moulds for forming crayons of a proper size.

Tunnel through the Alleghanies.

One of the tunnels through the Alleghanies, now constructing on the line of the Pennsylvania Railroad, is to be 3,570 feet in length. Its area, at the widest space within the lines of the masonry, will be about 24 feet, and the spring of the arch will begin 16 feet from the crown of the arch. About 400 men are employed upon it.

IMPROVEMENTS IN UPRIGHT PIANOFORTES.---Fig. 1.

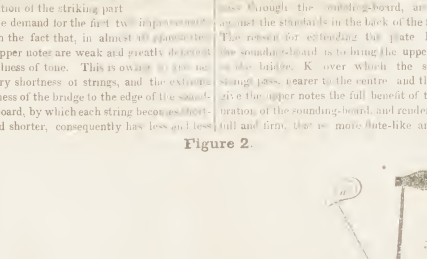


The annexed engravings are views of improvements in Upright Pianofortes, invented by R. E. Letton, of Quincy Ill., and for which a patent was granted the 5th of last October, (1852). The invention consists in a certain arrangement of the sounding-board, metallic plate, and bridges; also in the action or striking part.

Figure 1 is an elevated view of the metallic plate, sounding-board, &c., and Fig. 2 is a side elevation of the striking part

The demand for the first two improvements lay in the fact that, in almost all pianofortes the upper notes are weak and greatly deficient in fullness of tone. This is owing to the necessary shortness of strings, and the extreme nearness of the bridge to the edge of the sounding-board, by which each string becomes shorter and shorter, consequently has less and less vibration, and of course a diminution of tone as the bridge, which the short strings cross approaches the edge of the sounding-board. This difficulty is greatly obviated by the metallic plate I, fig. 1, which is secured to the frame a short distance in front of the sounding-board. The upper part of this plate, which carries the rest, *b b*, for the upright or shorter strings, J J, extends some distance over the sounding-board, and is supported by braces, C C, which pass through the sounding-board, and rest against the standards in the back of the frame. The reason for extending the plate I, over the sounding-board is to bring the upper part of the bridge, K, over which the shorter strings pass, nearer to the centre and thus to give the upper notes the full benefit of the vibration of the sounding-board, and render them full and firm, that is, more flute-like and not wiry and thin. The fact that the sounding-board can be more easily set in motion near its centre, than at the edge can be proved by a common illustration: thus place the two ends of a board on blocks, the nearer to the centre a person stands on the board, the more easily is it sprung. The same difficulty takes place in the bass strings, but the great length of these strings and the consequent strong vibration, overcomes the lack in the sounding-board.

Figure 2.



All persons acquainted with upright pianofortes, know their want of freedom to the touch; a performer is not able to play with the same expression as on the square or grand piano—it is not so sensitive to the light touch owing to the complicated combinations in the actions in order to reached the upper end of the strings. This improvement consists in constructing a simple and free action, and placing the strings within its reach, instead of additional machinery to reach the strings. This is accomplished by the bass or long oblique strings, F F, which are attached to or pass round pins in the metal plate or bracket, I, which is secured in nearly a vertical position in front of the metallic plate at the lower right hand corner, fig. 1; from thence they pass over the bridge, M, which rests on the sounding-board (an opening being made in the metallic plate to admit the bridge), from thence, crossing in front of the strings, J J, they pass over a curved bridge, N, which is firmly secured in a nearly horizontal position to the top timber or tuning block, C, terminating in the upper left-hand corner of the case. By this arrangement the greatest possible length of string is obtained. The bridge, N, is brought a little lower than the end of the metallic plate, in order to bring the long strings within reach of the action, it being necessary to strike the string within a certain distance of the end, to produce the greatest tone.

In figure 2, the action is all attached to the key-board, O, where the end of the key-board and one of the strings is shown, and that will be sufficient to explain the operation of the hammers on all the strings. P is the key; Q R is a bent lever, termed the jack, which hangs on a pivot, *g*: in a small block upon the back of the key, an upright wire, *h*, is secured in the top of the key, and passes freely through the arm, Q, of the bent lever. This wire is screwed and furnished above the arm, Q, with a button or nut of leather or other material, *i*, which is adjustable at various heights to regulate the height of the end of the said arm, which is thrown up against it by a spring, J, placed between it and the key. By thus adjusting the arm Q, the arm R is adjusted to bring its point or upper end to any required position. Attached to the back edge of the key-board, O, there is a perpendicular board, S, running the entire length of the key-board; to this board all the blocks, K, which carry the hammer butts, T, are attached. The hammer butt hangs on a pivot, *d*. and carries the hammer, *s*, in the usual way. When the key has been depressed, the hammer is then thrown back immediately after striking, by the weight of the butt, which is extended in the form of a low arm. The end of the butt, T, rests, when the key is at rest, upon a button, *e*, of the upper end of the wire, *h*, and in that position it is represented in the figure. This button, *e*, is adjustable on a screw on the wire, to regulate the fall of the hammer. On the under-side of the arm, T, there is a small cushioned block or projection, *p*, the office of which is to fall on the button, *e*, immediately after the hammer has struck and while the key is retained; the button, *e*, thus acts as a stop, and prevents the entire descent of the hammer by only allowing it to fall back a short distance, enabling the operator to repeat a note a number of times in rapid succession. The button, *e*, by being adjusted at a proper height of the wire, *h*, is also intended to leave the point of the arm R of the jack free of the butt when the key is free. The key is shown in shaded lines as depressed, the hammer being in the act of striking and just about to fall back. It will be understood by referring to the shaded lines, that the point of the key is set in throwing up the hammer arrives at the vertex of the shoulder, *m*, and then passes it, leaving the hammer free to fall back and bring its cushioned block, *p*, to the button, O, which it does instantaneously without perceptibly displacing the key lever, thereby rendering the notes sure and quick

The frame is made in a sub tantial manner, with oblique braces and oblique mortises, to resist the oppositie strain of the long or bass strings.

About the upright position of the pianoforte it is useless to say anything, for in this compact form it occupies much less space than in any other position and therefore is a more convenient, and more graceful article of furniture

More information may be obtained by letter addressed to the patentee.

Gold at the Mint.

From the first to the 15th of December, the receipts of gold at the United States Mint in Philadelphia, were $3,870,00—a large amount for the period, though not up to the unprecedented deposit of November.

Mr. Hind, of the Observatory of Regent's Park, London, has discovered another new planet, situated between the two bright stars in the horns of Taurus.

NEW INVENTIONS.

Spike-Making Machine.

A machine of the above description has been lately invented by H. B. George, of Nashua, N. H., who has taken measure to secure a patent. It consists of a pair of jaws furnished with a knife, for cutting the heated bar of iron to a proper size, the distance for inserting the bar being regulated by a stop, which is attached by a pivot to the table or platform, on which the whole apparatus rests. These jaws are curved, so that when the front ends are open the inner ones are closed, and vice versa. To operate them a crank is turned, which moves back and forth by means of a slide and toggle-joint, an action block connected with the jaws and also with the header. The action block, when drawn back its full distance, allows two springs attached to the table to throw inwards the inner ends of the jaws, and consequently to distend the outer ends, the bar is then inserted, and the movement of the crank being reversed, the action block is forced forwards and opens the inner ends of the jaws, and closes the outer ones. The header, which consists of a vibrating arm, is also moved forward at the same time, and forcing aside the stop forms the head of the spike by compressing the end of the iron bar against the inner side of the jaws in a small recess. While the jaws are closing the cutting edge of the knife, which works on a pivot on the upper surface of one of the saws, is moving outward, and coming in contact with the bar, cuts it off with a bevel. On reversing the movement, the action block is drawn back, the jaws are again opened and the spike now complete, falls out from between them.

Plastering Machine.

A machine for the purpose of superseding manual labor in the operation of plastering walls, has been invented by Isaac Hussey, of Harveysburgh, Ohio, who has taken measures to secure a patent. It consists of a movable frame upon rollers that can be adjusted to suit any height, and of a smaller frame sliding within it. The latter serves to support a mortar box containing the trowel, which is raised and lowered by means of a drum and endless chain. When in operation the trowel is supplied with mortar by a rod and follower, which are worked by a lever, the quantity being regulated or shut off, as required, by a slide that covers the opening in the box. For plastering ceiling it is only requisite to raise the mortar box to the top of the frame, and for side walls it is adjusted accordingly by turning it to a proper position. For this last-named operation the box is shifted by the sliding frame, which is moved back and forth for that purpose by means of the already-mentioned lever. There are also various cords and pulleys attached to the machine for facilitating the operations of the different parts, which are included in the invention and form a part of it.

Improved Clover Thresher.

In order to obviate the inconvenience at present experienced in threshing clover and other small seed, a new arrangement of the machine has been invented by Sandford Mason and Seth M. Eastman, of Millport, N. Y., who have taken measures to secure a patent. It consists in employing a cylinder with projections or teeth on its periphery, and two additional sets of teeth, one above fixed to the frame, and the other below on a fast bed; the former are used for threshing the straw, and are of a shape corresponding to that object; the latter are made concave, so that the projections on the cylinder fit into their recess, and thus act as a rasp, by which the seed are cleaned from the heads.

Improved Straw Cutter.

David and Lyman Clinton, of North Haven, Ct., have taken measures to secure a patent for an improved Straw Cutter Cylinder. The improvement consists in attaching a wrought-iron shaft to the cast-iron cylinder holding the cutters; this latter may be either cast around the former or cast separate from it, and afterwards secured by pins. The object proposed is to render the cylinder more durable, as cast shafts, which is the ordinary method generally break at the points where the knives are attached to the flanges.

Coupling Shafts and Axles.

A very ingenious contrivance for the above purpose has been invented by Safford E. Sturtevant, of Hartford, Vt., who has taken measures to secure a patent. It consists in securing the shafts of vehicles to the axle or the axle to the shafts, by means of an eye or collar with taper or conical ends, which fit in sockets attached to the shafts. A screw-bolt is inserted longitudinally through the eye or collar and the sockets to keep the ends firmly secured. To obviate any inconvenience from the wearing of the eye or collar, so that the ends would not fit tight, the shanks in which the sockets are sunk, can be brought nearer together by means of a nut on the bolt. The apparatus, although simple, will be found very efficient for the intended purposes, and it is a useful improvement on the ordinary method of uniting together the axle and shaft.

Counterfeit Coin Detector.

Harry G. Robinson, of Schuylkill Haven, Pa., has taken measures to secure a patent for an improved Coin Detector, which, from its portability, can likewise be used as a receptacle for coins and bank bills, thus superseding the employment of a port-monnaie. It consists of an outer cylindrical case, containing a likewise cylindrical gauge box, which is fitted with an aperture at one end of the proper size, to receive a genuine coin, so that if the counterfeit be larger it cannot pass through. For testing by weight, the outer case is made to serve as a balance, for which purpose a pair of clamps that are kept inside are withdrawn, and the small points inserted in fulcrum holes one on each side, which latter are placed at such a distance that the case will be in equilibrio when balancing the gauge box and a genuine coin.

Forcing Down Lids of Boxes.

A new contrivance for the above-mentioned purpose has been invented by George W. Wight, of New York City, who has taken measures to secure a patent. It is an apparatus intended for the use of packers, to force down the lids of boxes when they are to be fastened by screws or nails. It consists of a vertical screw working in a nut, which is formed in a cross-piece. Attached to this latter are a couple of bent arms which swing freely, and to the end of the screw is fixed an iron plate which bears on the top of the box, or rather on a stout board that rests on the lid. It will be perceived that, by turning the screw, the cross-piece will commence to rise, when the bent arms will catch on the sides of the box, and the screw will consequently be forced against the lid and the latter yielding to the impulse will close on the box.

COMPRESSED AIR RAILROAD BRAKE.---Figure 1.

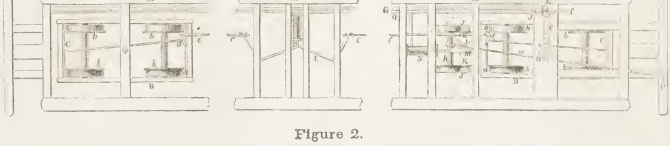
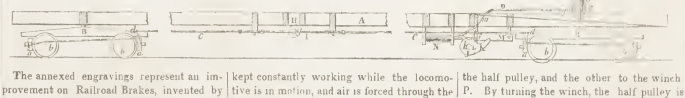


Figure 2.

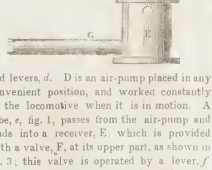


The annexed engravings represent an improvement on Railroad Brakes, invented by Abner Cutler and Jackson A. Rapp, of the city of Buffalo, N. Y., who have taken measures to secure a patent for it.

Figure 1 is a plan view of a car truck with the improvement applied to the brakes. Fig. 2 is a side elevation of fig. 1, the side of the truck being removed. Figure 3 is a detached view of a "receiver" provided with a valve. The same letters refer to like parts.

An air pump is employed to be worked by the locomotive, which forces air through tubes the whole length of the train, and operates pistons in cylinders, which act upon levers that operate the usual brakes. A is a car beds and B B are trucks attached to it. C C are common brakes on the trucks; they have shoes, *a*, which are made to bear against the face of the wheels. *b*, by means of the rods, *c*,

FIG. 3.



and levers, *d*. D is an air-pump placed in any convenient position, and worked constantly by the locomotive when it is in motion. A tube, *e*, fig. 1, passes from the air-pump and leads into a receiver, E, which is provided with a valve, F, at its upper part, as shown in fig. 3; this valve is operated by a lever, *f*. A tube, G, passes from the receiver, along the whole length of the train; the tubes of the several cars are connected by joints of some flexible material, such as vulcanized india rubber; each car has a separate tube: the several tubes, when united, form a continuous one the whole length of a train. H is a cylinder communicating with tube, G; there is a like cylinder for each car. Each cylinder has a piston inside, which is moved to one end, when air is admitted; *g* is the piston rod; I is a system of jointed levers, the piston rod, *g*, acts against them. A toggle joint is placed under the centre of each car bed, and is connected to the ends of the rods, *c*, of the brakes. The manner in which the brakes are operated will be readily understood by what has been said.

The air-pump, D, it will be recollected, is kept constantly working while the locomotive is in motion, and air is forced through the tube, *e*, into the receiver, E. The lever, *f*, of the valve, F, is arranged by any suitable means, so as to be kept elevated, and the air then passes out. When it is necessary to apply the brakes, the lever, *f*, is depressed by a brakesman or engineer, and the valve is then closed, consequently the air is forced by the air-pump, D, into the tube, G, and as the cylinder, H, communicates with the tube, G, the piston in the cylinder is forced out, and the rod, *g*, acts against the toggle joint, I—the toggle joint drawing the ends of the rods, *c*, nearer to each other, and forces the brakes, *a*, against the faces of the wheels, *b*. When the brakes have been applied a sufficient time, the brakesman or engineer withdraws his hand from the lever, *f*, which rises, and the air then passes from the receiver through the valve, and the springs of the brakes throw the toggle joints back.

Another brake arrangement is represented in the front trucks of figures 1 and 2, to cause instantaneous stoppage of the cars; J J are two shoes on an axle, *h*. The shoes are in line with wheels *b b*, and directly over the rails; they are of circular shape and have horns, K. There is a half pulley, L, attached to the middle of axle *h*; it has a pin, *i*, passing through it, which, when the horns, K, are elevated catches into a recess, *l*, on a lever, M, directly over the half pulley. By means of the halt pulley and pin, the horns are prevented, when not required, from falling upon the rails. These shoes are operated in the same manner as the brakes previously described. N is a cylinder provided with a piston, and communicating with the tube, O, which is connected with the receiver. The tube, O, has a stop-cock, *j*, in it near the receiver; this cuts off communication with the receiver, when the brakes, C, previously described, are applied. But when it is necessary to stop the cars instantaneously, in case of obstructions on the rails, the stop-cock, *j*, is turned to let the air into the tube, O, the lever, *f*, of course being depressed at the same time. The air then acts on the piston in cylinder, N, its rod, is forced outwards, and the lever, M, frees the pin, *i*, from its recess, *l*; the horns, K, then drop down upon the rails, and by their great friction arrest the progress of the cars. The tube, O, may be continued the whole length of the train in the same manner as tube G. These shoes are elevated by a chain, *m*, the end of which is attached to the periphery of the half pulley, and the other to the winch P. By turning the winch, the half pulley is turned, and the horns, K, are elevated, the pin, *i*, catching into the recess, *l*, in lever, M. When the horns are elevated, the winch is reversed and the chain slacked, when the shoes are ready for instantaneous operation.

More information may be obtained by letter addressed to the inventors.

Register for Clocks.

P. M. Statzell, and J. L. Kucker, of Philadelphia, have taken measures to secure a patent for several improvements in the Watchmen's Register Attachment for clocks. This is a contrivance to render more efficient an apparatus which is used in many large establishments where a night watchman is employed. The system generally adopted is to have a clock so arranged that the watchman, by pushing a pin or by some other similar operation, acts upon a dial, which, upon examination next morning, exhibits a record of his vigilance. The instruments in general use are open to many objections, of which the chief is their liability to be tampered with by an untaithful officer. To supply a more efficient register, which cannot be altered, is the intention of this patent, and for this purpose several improvements have been introduced. The first is the registering apparatus, which consists of a dial divided into 24 equal parts, corresponding to the half hours, which are all marked by a numeral, one of which will always be visible through an aperture in the clock dial. The motion of the registering dial is regulated by a ratchet wheel and spring pawl, which are acted upon by a contrivance connected with the clock-work, and so adjusted that, at the end of each half hour it assumes a vertical position and on a lever being moved by the watchman, it imparts motion to the ratchet-gear and registering dial, which is thus made to rotate and exhibit another numeral through the aperture already mentioned. Should the watchman have neglected to visit the clock at any of the half-hours, it is possible that, to avoid detection, he might seek to turn the register more than one division at his next visit, this fraud is prevented by an arrangement, which holds the ratchet click in its place (after it has passed over one tooth of the ratchet wheel) until the watchman's lever can no longer affect it. Another improvement is in the manner by which it is rendered impossible to shift the hands of the clock except by the authorized person

Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING MARCH 22, 1853.

HYDRAULIC STEAM PUMPS.—By H. N. Black, of Philadelphia, Pa.: I do not claim a double cylinder pump or water engine, nor opening a valve at the end of the stroke of a steam piston, and injecting water into a steam cylinder, for producing a partial vacuum; but I claim the combination of the double slotted water and steam cylinder, double piston, and slotted piston rod, arranged and operating in the manner set forth.

SEPARATING PAPER BY SINGLE SHEETS.—By J. P. Conaty, of Dayton, Ohio: I claim, first, a table or range of tubes, connecting with an exhaust pump or vacuum, for separating the edge of a sheet from a heap of paper, by atmospheric pressure, in combination with a roller, or its equivalent, traversing to and fro on the upper sheet, for the several purposes of lowering and admitting air between the leaves, presenting the edge of the top sheet to the tubes, and, on its backward stroke, serving to straighten the pile.

Second, the tube or tubes aforesaid, in combination with the vibrating supporting bar, for upholding the forward edge of the sheet when dropped by the tubes, prentice it properly to the fingers, and supporting it from the heap, while being drawn away.

TANNING.—Roswell Enos & Bela T. Hunt, of St. Charles, Ill.: We claim the process of tanning with the use of lime, salt, bran, sumac, and cutch, or any other tanning in room of cutch, substantially in the manner described, whereby we are enabled to operate at the same time that we commence reducing, as the salt and bran overpower the lime, and takes the place of the lime, and converts the hide into more perfect leather, and in less time than can be made in any other way.

Hides are not liable to get damaged by our process, as we do not use an article that is injurious to leather.

It is not on the materials used that we claim letters patent, but on the manner of applying them to the hide, as set forth.

CHEESE PRESSES.—By Mills A. Hackley, of Belleville, N. Y.: I claim the turning table or its equivalent, in combination with the roller in such manner, that whenever the table is adjusted for turning the cheese, there will be a corresponding adjustment of the roller for facilitating the process of turning the same.

KNITTING MACHINES.—By Wm. Mansfield, of Dracut, Mass.: I claim forming the loops, in knitting ribbed fabrics, by the combination of two sets of needles, made to operate together, as set forth, the same studding me to give important advantages in the construction and operation of the loom.

DISTILLING ROSIN OIL.—By James Riley & Wm. Allen, of Southfield, N. Y.: We claim the process by which we manufacture oil from rosin, by passing it from an alembic, through expanding worms, or their equivalents, surrounded by a jacket of fire-brick or clay, whereby we prevent the destructive distillation, carbonization, and greatly economize time, as set forth.

HARNESS.—By James Stanbrough, of Newark, N. Y.: I claim the forming of ronnds, raises, or rolls, on the different parts of a harness or other leather work, by doubling and rolling together a strap of leather, at its edges, and then binding these edges by a separate piece, and connecting the stitching of such binding, by drawing the thread through the side thereof, folds of the strap; and this I claim, whether the single strap only be used for forming a single roll, or a secondary strap be used for forming two or more rolls, as described.

PEGGING BOOTS AND SHOES.—By Seth D. Tripp, of Rockport, Mass. (assignor to himself, Norfolk, of Salem, Mass.): I claim the combination of each frame, with its supporting shaft, by means of a rocker frame, the same being constructed and arranged in a free vertical, as well as other movements, as described, by either of the frames, so that it may be guided, in its vertical movements, in close proximity of the upper surface of the sole of the boot or shoe, and horizontally by the cam wheel, substantially as specified.

Also the manner of combining the awl and driver with one carrier, made to operate in close proximity to by they are alternately presented or brought down against or toward the sole, by the revolution of the carrier, as specified.

Also the combination of the guide with the knife or chisel, so as to operate therewith, in the manner and for the purpose of guiding and aiding in properly against the peg wood, as described

Also the improvement in the construction of the charger viz.: the making of the same, with two or more separate compartments for holding the strips of peg wood, which compartments are to be successively brought forwards under the operation of the piston slide, as the several pieces or strips of peg wood are successively cut up into pegs, substantially as claim a combination of a series of compartments, in the one single piston slide, made to operate as set forth.

Also the combination of mechanism by which the charger is moved, the same consisting of the operating spring rack, click or pawl, and spring, applied to the upright part of the pawl, the whole to act in conjunction with the piston slide, substantially as set forth.

Also the combination of mechanism for operating the slide, the same consisting of the ratchet rack thereof, impelling pawl, spring lever, cam, ratchet wheel, and spring hook pawl, as applied to the frame and the bar, and made to operate substantially as set forth, the same causing peg wood to be shoved through the charger, and keeping the pegs in advance of the peg wood, and successively forcing them into the correct position over the hole made in the sole by the awl.

And, in combination with the pressure spring, I claim the lever, with its bent projection, spring, bent lever, and cam, the same being for the purpose as set forth.

The public debt of the United States due 1st July, 1853, and which the Secretary advertises will be paid on presentation, amounts to within a fraction of six millions of dollars.

Artesian Well.

An artesian well of great depth is being bored at present at St. Louis, for a sugar refinery in that city. It was begun in 1849, and has been worked 1,590 feet, nearly half the depth of the celebrated artesian well in Westphalia, Germany, which is sunk 2,385. The object is to obtain a supply of other than limestone water which is the only sort that can be found by the ordinary channels in that vicinity. At the present depth of 1,590 feet a pretty copious stream of sulphur water flows from the well, having precisely the taste of the Blue Lick water in Kentucky, although perhaps it is not quite so thoroughly impregnated with sulphur. It is, however, concluded from recent indications, that a supply of pure sweet water will be now obtained. The following is a list of the different strata bored through in the course of operations.

1st. Through limestone, 28 feet; 2nd, shale 2; 3rd, limestone, 231; 4th, chertz rock, 15; 5th, limestone, 74; 6th, shale, 30; 7th, limestone, 75; 8th, shale, 1½; 9th, limestone, 35½; 10th, sandy shale, 7½; 11th, limestone, 128½; 12th, red marl, 15; 13th, shale, 30; 14th, red marl, 50; 15th, shale, 30; 16th, limestone, 119; 17th, shale, 66; 18th, bituminous marl, 15; 19th, shale, 80; 20th, limestone, 134; 21st, chertz rock, 62; 22nd, limestone, 134; 23rd, shale, 70; 24th, limestone, 20; 25th, shale, 56; 26th, limestone, 34; 27th white soft sandstone, 15 feet.

The well was first commenced as a cistern. From the surface of the ground, where it is fourteen feet in diameter, it has a conical form, lessening at the depth of thirty feet to a diameter of six feet. Thence the diameter is again lessened to sixteen inches, until the depth of 78 feet from the surface is attained. From that point it is diminished to nine inches, and this diameter is preserved to the depth of 457 feet. Passing this line the diameter to the present bottom of the well, is three and a half inches.

The lowest summer stand of the Mississippi river is passed in the first stratum of the shale, at the depth of twenty-nine or thirty feet from the surface. The water in the well however, is always higher than the water line of the river, and is not affected by the variations of the latter. The first appearance of gas was found at a depth of 566 feet, in a strata of shale one and a half feet thick, which was strongly imbued with carbonated hydrogen. When about 950 feet below the surface of the earth at the beginning of a layer of limestone, the water in the well became salty.

The level of the sea—reckoned to be five hundred and thirty-two feet below the city of St. Louis—was passed in the same layer—two hundred feet lower still, in a bed of shale, the water contained one-and-a-half per cent. of salt. At a depth of 950 feet, a bed of bituminous marl 15 feet in diameter was struck. The marl nearly resembled coal, and on being subjected to a great heat, without actually burning, lost much of its weight. In the stratum of shale which followed, the salt in the water increased to two-and-a-half per cent. The hard streak passed was a bed of chertz, struck at a depth of 1,179 feet from the surface, and going down 62 feet. In this layer the salt in the water increased to full three per cent. The boring at present is, as appears by the statement above, in a bed of white soft sand rock, the most promising that has yet been struck for a supply of water, such as is wanted.

Observations have been made with a Celsius thermometer of the temperature of the well. At the mouth of the orifice, the thermometer marks 50 degrees; at the depth of 45 feet, the heat is regular, neither increasing nor diminishing with the variations above, and at the distance of 351 feet, the heat has increased to 60 degrees. The calculations in the books give an increase of one degree in the temperature, for every additional 100 feet of depth, so that at the depth of 5,000 feet, the heat is supposed to be so intense as to melt iron.

[The greater part of the above is extracted from the "Missouri Republican," we therefore do not take upon ourselves to endorse the opinion therein mentioned of a gradual rise of temperature on getting deeper from the earth's surface, such hypothesis is a favorite one among some geologists, but we must have something more than theory before we can affirm that the phenomenon last mentioned is sure to occur at the depth indicated.

Poison Fang of Serpents.

The instrument with which the cobra and other venomous serpents are armed in so deadly a manner, consists of several parts, namely, the tooth or poison fang, the movable stock or handle in which it is fixed, called the jaw, the muscles or moving powers of the jaw, the bag containing the deadly liquid called the poison sac, the pipe which carries the venom into the tooth or poison duct, and the squeezer or muscle that drives the venom from the bag, along the duct, through the tooth into the wound which the latter inflicts. The tooth is not implanted in a socket like ordinary teeth, but is firmly soldered, as it were, to the jaw bone, which commonly has no other tooth to support, and is singularly modified in size and shape, to allow of the movements requisite for the deep plunge of the tooth into the object aimed at. The tooth, in structure resembles what is called the canine tooth, which consists of a hard, pointed, long and slender cone, with a hollow base, and if we suppose such a slender and partly hollow cone to be rolled out flat, the edges then bent towards each other, and soldered together so as to form a canal open at both ends, we shall form a good idea of the general form and structure of a poison fang. The edges of the flattened tooth wheel we have supposed to be so approximated, are bent round the end of the poison duct, which closely adheres to and lines the canal, and the line of union of the two edges runs along the front and concave side of the slightly curved fang. The barrel aperture of the poison-canal is oblique and its opposite or terminal outlet is still more so, presenting the form of a narrow elliptical longitudinal fissure at a short distance from the fang's point, this is left solid and entire, and fit for the purpose of perforation. It is only the upper jaw that is so armed, and it is so formed that the upper jaw of the venomous serpent is not fixed, but plays or rotates backwards and forwards, having special muscles for those movements which, when they push forward the jaw bring the tooth attached to it into a vertical position, ready for action, and when they draw back the jaw, replace the tooth in a horizontal position, where it rests, with the point backwards, hidden in a bed of soft and slimy gum. The wound is inflicted by a blow rather than by a bite, the poison fangs, when erected, are struck like daggers into the part aimed at, and as the action of the compressing muscles of the bag is contemporaneous with the blow by which the wound is inflicted, the poison is, at the same moment, injected with force into the wound from the apical or terminal outlet or the perforated fang.

The New Silver Coin.

The weight of the new silver coinage authorized by the recent act of Congress, which goes into operation in June next, as compared with that coinage since the passage of the act upon the same subject in 1837, is as follows:

Silver.	Act of Jan., 1837.	Act of Feb., '53.
Dollar	412½ grains.	No change.
Half Dollar, 206	"	192 grains.
Quarter do. 103	"	96 "
Dime, 41	"	38·40 "
Half Dime, 20	"	19·20 "

Spiders' Thread.

Austrian papers state that a merchant of Vienna has lately presented to the Industrial Union of that capital the details of a series of experiments made by him to manufacture spiders' thread into woven tissues. The thread is wound on a reel, and two dozen spiders produce in six minutes a beautiful and delicate thread, two thousand feet in length. The stuffs manufactured are spoken of as being far superior to those of silk in beauty and delicacy of fabric.

Cotton in Africa.

Thirty varieties of cotton have been found growing spontaneously in Africa. A missionary says he has stood erect under the branches of a cotton tree in a Goulah village so heavily laden with bolls that it was propped up with forked sticks to prevent it from breaking under its own weight. The cotton was equal to that of any country. The natives manufacture cotton goods extensively.

Miscellaneous Items.

The block of marble for the Washington Monument, ordered by the Common Council of New York is now finished, and is larger than any that has yet been sent, being eight feet wide, and five feet six inches in height. It weighs about four tons. The design is the arms of the city of New York, cut in very high relief, surrounded by a beautiful wreath of oak and laurel leaves. The whole is surmounted by a large eagle standing on a globe. The block bears the following inscription, in raised letters:—"Corporation of the City of New York." The border is composed of bundles of rods, encircled by a ribbon, to denote that in union there is strength. The cost of the block will be about $2,500.

The Pacific Railway in Missouri, has one of the most remarkable (though not the longest) tunnels in the world. For 630 feet in one part, and 400 in another, it is cut through the solid rock. The approaches to it, for long distances are cut fifty feet in depth, faced with the rock. The tunnel itself is sixteen feet high, arched over.

No less than 40,000 pine logs have been cut, and 25,000 have been put into the river at a point sixty-five miles from Potsdam, St. Lawrence Co. A quantity sufficient to make 25,000,000 feet of lumber, which, to be brought to market, will pay a toll of $9,000 to the State.

The annual amount of lead produced from the Wisconsin Lead Mines, is about 40,000,000 pounds, which, at five cents a pound (a low enough estimate now,) amounts to $2,000,000.

The Pennsylvania Railroad Company have reduced the rate of freight on bacon, beef, pork, whiskey, lard and lard oil, to 50 cents per 100 lbs. from Pittsburg to Philadelphia or Baltimore.

The Manchester (England) Chamber of Commerce have advanced a loan for experimenting in the culture of cotton in Trinidad, for which purpose a model farm is to be laid out.

The deliveries of tea recently in London, for one week were 509,218 lbs.

The ice merchants say there will be a large deficiency in the supply of that article the coming summer. Only about half the average annual crop has been stored. But about 100,000 tons are said to be stored. Last year it was 200,000 tons and over.

One Hundred Miles Per Hour.

"A Maine Yankee" announces through the "National Intelligencer," the invention of a form of road and improved locomotive, which, he says, will safely transport the mails and passengers at the rate of one hundred miles per hour! The writer further says he has been made acquainted with the details of these improvements, "which are so palpably correct in theory, and feasible in practice, that every civil engineer and railroad man will, on examination, at once recognize them as the desideratum, even to the extent of safety and speed above indicated." The next Congress, it is said is to be invited to secure its adoption, and give to the world the result of the first experiment.—[Exchange.

[Let us know the plan and then we can form some opinion of its correctness. It may be good and may be perfectly futile. We would state that 100 miles per hour have been run by a locomotive already.

The Great Chestnut Tree.

On one side of Mount Etna there is a famous chestnut tree, which is said to be one hundred and ninety six feet in circumference, just above the surface of the ground. Its enormous trunk is separated into five divisions, which gives it the appearance of several trees growing together. In a circular space formed by these huge branches a hut has been erected for the accommodation of those who collect the chestnuts.

New Iron Works.

The furnaces at the Mt. Savage establishment, Md., are now in blast, and the rolling mill continues, as it has done for some time, to turn out daily a large amount of superior rails. Over nine hundred hands are now kept busily employed, and the population of the place is not far from five thousand.

riculturists who are interested in ditching, and have large wet meadows or prairie lands which require ditching and cheap fencing.

More information may be obtained by letter addressed to the patentee, at Jackson, Mich.

MISCELLANEOUS.

The Philadelphia Mint—Refining Gold—Its Troubles and Trials.

On page 29, this Vol. "Scientific American," we briefly reviewed a pamphlet by R. S. Culloh, late Metal Refiner at the Mint at Philadelphia, now of Princeton, N. J. An answer to that pamphlet has been published and is now before us, by the present Melter and Refiner, James C. Booth. The pamphlet is a letter to our now ex-President Fillmore, and we have been requested to peruse, and notice it, and in courtesy we will do so. The letter of Prof. Booth, is remarkably temperate in language and we like the spirit which pervades it.

The historical origin of the transaction in question may be thus briefly stated from Prof. Booth's publication. Prof. McCulloh was melter and refiner at the U. S. Mint, at Philadelphia, for some time prior to Dec., 1849; before which period he had invented a new process for refining gold, in regard to which he took the preliminary step for a patent within a few days after his accounts at the Mint had been closed. He was succeeded in his office by Prof. Booth, who, in attempts to improve the methods actually in use, left, as he says, upon one which turned out to be the same with that earlier invented by Prof. McC., and which, though characterized by remarkable facility in the earlier stages, presented extreme difficulty in the lamination, afterwards, of the gold refined by it. Prof. Booth was thus induced to devise another process, for which, in August, he, in conjunction with Prof. Morfit, now of Baltimore, also took out a patent. As neither of the processes had been experimentally tried on a sufficiently large scale, and as the parties, up to this time at least, appear to have had mutual confidence in one another's learning, skill, and fairness, they concluded to join their interests in the two patents, and subsequently procured an appropriation from Congress of $25000 for the purchase of that one which, upon fair trial at the Mint in Philadelphia, should prove to be the better. The experiments for determining this question were made in the last part of 1850 and first month of 1851, under the instructions of the then Director of the mint (Dr. R. M. Patterson) and by Prof. Booth, who, having succeeded in overcoming the brittleness of the metal that had before resulted under the McCulloh process, recommended that process for adoption at the Philadelphia Mint, where the establishment was ample and regular, and the other—the Booth and Morfit process—for adoption in California as being the cheapest and most flexible and best adapted for extemporized and less extensive mints.

But so far, these experimental tests related to the quality of the metal and the quantity of it that could be refined in a given time. And before the recommendation of the McC process was adopted, the Director ordered that another very important particular—the relative waste of gold, under the several processes,—should be observed. These observations are stated to have been in fact made by the Director himself and to have proved unfavorable, by showing a greater waste in the McCulloh than in the old or Mint process, with this result before him, in spite of the recommendation of Prof. Booth, in other respects Dr. Patterson disapproved the introduction of the McC. process into the Mint.

Prof. McC. was naturally dissatisfied with this issue, proposed and with the consent of Prof. B. procured a dissolution of the partnership which had existed in the two patents; and founded upon the circumstances attending the events which we have thus briefly sketched, grave complaints and charges against Prof. B. in particular. These charges were formally laid in the Treasury Department, from which they were duly referred, in the latter part of 1851, to the then Director of the Mint—Dr. Eckert, successor to Dr. Patterson—for investigation. The Director reported them back as unsustained. Subsequently, the Treasury Department authorized Prof. McC. to apply his process himself within the walls of the Mint at Philadelphia, as he did, on April 1, 1852, upon about a quarter million of gold, but in result showing more waste than the ordinary Mint process, the Director disapproved the introduction of the new method. To this disapproval, Prof. McC. takes exception; and in a printed letter to Mr. Corwin, in August, 1852, states his exceptions and renews the charges against Prof. B. We understand the pamphlet of Prof. B. is a reply to the original and to the renewed charges.

The charges thus replied to may be assembled in three groups; according to their purely personal, their official and their mixed character.

To the first of these belongs the allegation of disingenuousness at the time of the formation of the partnership. Prof. B. declares that he assented to the partnership originally at Prof. Culloh's suggestion and acquiesced in its dissolution at Prof. McC.'s request.

The second group of charges are those which affect the official relation and standing of the Melter and Refiner at the Mint, and amount to a general allegation of unskilfulness and neglect of duty. Without taking up the minute and particular answers of Prof. B., which we have not room to enumerate, it is sufficient to say that he refers to the evidence of two successive Directors of the Mint. On this point, Prof. B.'s pamphlet furnishes some very interesting statistics, which of course we accept as authentic and reliable. From these we have reduced the following table of deposites of Gold at the U. S. Mint per month.

McCulloh Refiner—	Least amount.	Greatest.	Average.
1849 . . .	30,000	793,000	404.200
Booth Refiner—			
1849 . . .	747,000	1,669,000	1,208,000
1850 . .	1,005,000	4,579,000	2,660,750
1851 . .	2,818,000	5,577,000	3,977,333

With these results before us, which show an amount of work for Prof. B. nearly ten times as great as Prof. McC. was used to—indeed an amount that we believe one is quite correct in saying to be unprecedented in the annals of minting.

It is true that the existence of a large bullion fund might be significantly connected with this silence of depositors, who being paid out of such a fund, directly, the *value* of their deposits is ascertained by assay and weighing, have no reason for concern with the subsequent management of what they have deposited and sold. But according to Prof. B.'s statistics, the bullion fund of 1849, in Prof. McCulloh's time, was $1,000,000, when the average monthly deposit was $404,200 and the ratio, therefore, of the amount kept on hand to meet payments to the amount required to be paid, was very nearly 2½ to 1. The same fund now is $4,000,000, and the average monthly deposits as much, showing a ratio of equality between the fund and deposits, or of 1 to 1. This may be plainer in the following account:—

In 1849, McCulloh, Refiner, monthly average deposits, 400,000; constant bullion fund, 1,000,000; ratio—deposits 1, bullion 2½.

In 1851, Booth, Refiner, monthly average deposits, 4,000,000; constant bullion fund, 4,000,000; ratio—deposits 1, bullion 1.

It is obvious that, with prompt payments, there must be a bullion fund whose amount, other things being equal, must vary in proportion to the amount of deposits in a given time. All that skill can do, is, in the rapid melting and refining of these deposits and the replacement of the bullion fund to lessen this proportion. Whether Prof. B. has reached the utmost limit in this respect, cannot of course be apprised; but under his management progress has been made towards it; and in taking off 60 per cent. of the unfavorable proportion that existed before he certainly cannot be held to manifest want of skill.

In another important particular relating to the economy of his management, and which is of interest to the government, just as the diminution of the bullion fund is, viz., the *waste* in the meltings, Prof. B. exhibits a similar improvement, as shown by the following table:—

McCulloh Refiner—	Oz. melted.	Oz. wasted.	Loss.
1849 . . .	673,000	239	·00035+
Booth, Refiner—			
1850 . .	3,000,000	689	·00022+
1851 . .	2,555,000	635	·00025—
1852 . .	5,074,000	1,247	·00025—

The weights have been given here only to the nearest thousand ounces; in the pamphlet they are set down to the nearest ounce. The quantities in the last column result from the exact numbers; the sign + showing that the quotient is too small, and the sign — that it too high. They show a diminution of waste effected by Prof. Booth of 1-10000th, and a saving of that extent over the results of his predecessor. Had the waste admitted by Prof. McC., during the latter part of his management, been allowed to continue by Prof. B., the dead loss would have been, up to Aug. 1852, more than 1000 ounces, or upwards of 18000 dollars, for the saving of which Prof. B. may undoubtedly claim credit.

Again, in the earliest practice of refining gold by the nitric acid process, 3 lbs. of silver were alloyed with 1 lb. of gold, in order to effect the subsequent *parting* of the latter; from which proportions, the fine gold being a quarter of the alloy, we still have the term *quartation*, although it has ceased to be significant. Later improvements allowed the use of 2½ lbs. silver to 1 lb. gold, which was the proportion habitually employed by Prof. McCulloh in the U. S. Mint Prof. B. avers that he requires but 2 lb. silver to 1 lb. gold, thus sparing 1-5 of the silver formerly used. It is probable that, in this respect he has reached the utmost limit of economy; but whether or no he has certainly lessened the room for reproach in thus economizing upon the costly materials required even by his immediate predecessor.

The last group of charges to be referred to, affect at once the official and individual character of the party, and include allegation of fraud or clumsiness in the trials made by Prof. B., at the Mint, of Prof. McC.'s new process. To us it appears that a charge on this account is not happily nor reasonably made by the latter; for the issue of those trials was a direct and positive recommendation of the said process for exclusive employment at the Mint in Philadelphia. Whether the trials, then, were fairly and skillfully or dishonestly and awkwardly made, Prof. McCulloh, inasmuch as he obtained a favorable verdict, is hardly the person to be heard in complaint. Other persons, we ourselves for instance, might express our surprise that so emphatic a recommendation should have been given before one of the most important considerations—the waste—had been weighed; but not the party whose interest was in the way of being subserved by the premature recommendation. But however this may be, it appears that Prof. McC. had and used the opportunity of nearly three months' trial of his own process under his own direction at the Mint, without succeeding in convincing the Director that it is preferable to the one habitually employed. Now, it may be that the Director was unduly difficult to convince, but it is reasonable to say that all defects whatever in Prof. B.'s trials were cured by the actual intervention of the party devising, and therefore most interested and best knowing how to carry out his own process.

The cause of our remarks has led us now to the merits of the processes which have given rise to the pamphlet in question; a subject which, in the beginning, we hinted our intention of not discussing, for it is our opinion that there are better ways than have been so far adopted for preventing or quieting the discords of which we have been treating, and which neither help science herself nor her votaries. That it may not be supposed we were using random phrases or dealing in unreflected generalities, we conclude this notice with what seems to us a practical suggestion:—Let a commission of three (or any multiple of three) persons sufficiently distinguished by their knowledge of the subjects, be constituted under the authority of the Treasury Department, whose functions shall be to superintend at some fitting time, and upon a suitable scale at the Philadelphia Mint, full and fair trials, of the proposed new processes, so as to set at rest, once and for all the questions that have been raised; in whose discussion the public can hardly be expected to take interest further than as they affect the vindication and, if requisite, the amelioration of the Mint establishment, whose integrity and judicious administration ought to be, for the credit of the government of our country, above suspicion.

Buried Alive.

Galignani gives a thrilling account of two men and a boy being buried six days and six nights, in a marl pit at Ecrettville, in the department of the Seine Inferieure, who were finally rescued alive. During the whole of that time they were without food, without light, and almost without clothes; and they were in such a confined place, that with the exception of the boy, they could not stand upright. Boitard, the eldest man, declares that during the whole time he did not sleep more than two hours; but his companions, and especially the youngest one, more. They slept back to back. They felt no hunger and Boitard says that even if they had provisions, they would not have touched them; but they experienced great thirst. On the fourth day they found a little water, thick with marl, by digging into the bottom of the pit. It was this water, probably, which preserved their strength. At first they heard the noise of the pickaxes and spades above them; but during the last three days their breathing was so loud as to prevent it from reaching them, and this circumstance naturally increased their agony of mind; they also feared the miners were digging in a wrong direction. One of them had about 50 chemical matches and a small piece of candle; but though they often tried, they could not, for want of air, cause the candle to burn. During the latter part of the time they became so exhausted as to be unconscious of their position; but the boy once cried as if in a dream, "There is the rope, Boitard! Let us ascend!" One moment and a breath of air rescued them, they fainted, but after a while they recovered.

(For the Scientific American.)

Dust from Stoves.

As a subject for improvement in stoves—parlor, cooking, or any other description, let me suggest to our inventors and patentees, the remedy of one serious detriment which has invariably been overlooked up to the present hour—that is, a mode, plan, or adaptation of carrying off the dust when it is raked so that it shall not spread over the room, covering every thing with ashes—that is, dust; to me, and I should suppose to every one, it is a matter of serious inconvenience.

The remedy I propose is to have an aperture under the grating leading to a pipe-way communicating with the usual pipe attached to all stoves, this aperture to have a sliding door, to be opened when the fire is raked, and closed all other times, unless desired to check the draught; this method—something like which I have seen in the brick settings of grates in England, would produce the great advantage of carrying the ash-dust up the chimney and not over the room, furniture, or occupants. This mode could be easily adopted in our new castings, running up behind the back stove plate, and into the pipe, and would be a universal benefit to our families and housekeepers in general, and to none more so than to Yours, &c., A Sufferer.

Patent Case.

On the 12th inst., in this city, before Judge Nelson, a patent case was decided for the infringement of a patent for the manufacturing of cotton batting, Hamilton B. Lawton et al. agt. Russell B. Stebbins et al. The plaintiffs alleged that defendants infringed their patent for a machine for manufacturing batting, they having manufactured and sold 1,000,000 lbs. of batting, made on their plan. The amount of damages claimed was $10,000. A verdict was granted for $1,235.

The Floating Battery.

Preparations for constructing the proposed floating battery for the United States Government, designated for harbor defence, are actively going forward at Hoboken, by Robert L. Stevens, the contractor.

Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

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Method of Detecting Counterfeit Silver Coin.

If a piece of silver be dipped into a solution of chromate of potash, decomposed by sulphuric acid, (thirty-two parts by weight of water, three of chromate of potash, and four of sulphuric acid), the parts of the silver immersed in the solution quickly assume a purple colour. The colouring is deeper and more lively when the silver is quite pure, and diminishes in proportion to the quantity of alloy mixed with it. Of course this process will not hold good when a coating of silver has been deposited on a piece of white metal, &c.; in such cases as plated or electrotyped articles, for instance, a portion of the coating must be filed off; upon trial by this process, the German silver will remain of a white color. No other metals give the same color as silver when submitted to this test; copper, zinc, &c., are acted upon by the solution, but not colored as in the case of silver.

Sugar of Milk for Invalids.

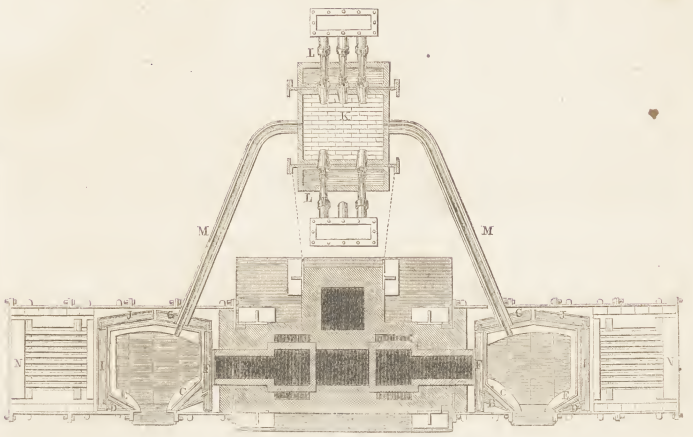
A short time ago Dr. Turnbull, of Liverpool, read to the Literary and Philosophical Society a paper on the use of sugar of milk as an article of food in consumption and other pulmonary diseases. It now appears that whey is coming into extensive use in Germany in the treatment not only of consumption, but also of gout and rheumatism, and that some German physicians entertain opinions as to the beneficial properties of sugar of milk (the ingredient to which whey owes its virtues) similar to those lately put forth by Dr. Turnbull. In the cheese dairies of this country the whey is frequently given to pigs, or otherwise wasted, and the lactine, or sugar of milk, now met with in commerce, is brought entirely from Europe, being prepared chiefly in Switzerland. Its present high price is, however, a great obstacle to its general use as a dietetic remedy; but it is most desirable that so valuable an article of food should no longer be wasted, and that therefore the attention of those engaged in making cheese should be directed to the manufacture of this other product from milk, which must sooner or later become an important article of food and of commerce.

Factory Labor in Rhode Island.

The recent passage of an act by the Rhode Island Legislature, making ten hours a legal day's work, is creating considerable disturbance among the manufacturing villages of that State. Upon the day on which the law went into operation many of the factories were closed the proprietors not being willing to have the law obeyed. A convention of manufacturers has since been held at Providence, and it was decided by them that the operatives should bargain to labor nine hours on Saturdays, and twelve hours during the other working days of the week, or they should not give them employment.

Prof. Silliman, Sen., has resigned his situation in Yale College. His son has been appointed to succeed him. Prof. Silliman has long been a distinguished teacher and writer on scientific subjects. In chemistry he has long held a high place.

IRON REFINING AND PUDDLING FURNACES.---Fig. 1.



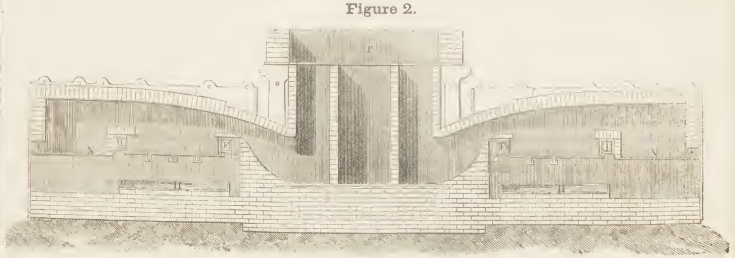
The iron interests of our country are of great and rapidly increasing importance. All information, therefore, relating to improvements, small and great, in the manufacture of iron, is of no small consequence. The iron deposits of our country are on a scale commensurate with its vast extent, and the coal and wood to reduce the ores to metal, are more liberally supplied by the hand of nature than in any other country on the face of this terrestrial ball. The United States of America, are destined to be the greatest iron manufacturing countries in the world, and it is perhaps a great shame to us that they are not so at present. Be that as it may, however, no one can doubt, who is at all acquainted with both the resources and wants of our country. that the day is not far distant when it will be what it now should be.

The annexed engravings are views of improvements in iron furnaces by Joseph Jones, of Bilson, Stafford, in England, an experienced iron maker. They consist, first, of the application of a cooling current of water to a water space, encircling the heated mass in the puddling furnace, to keep cool the materials of which the furnace is composed, and comparatively uninjured during the time it is in operation. Second, the combination of the refining with the puddling furnace by ducts passing between the two, so that the refined metal may flow directly from the chamber on to the puddling hearth, dispensing with the loss of time by removal, &c. Third, connecting the refinery furnace flue with a chimney, to carry off the heated air from the refinery. Fourth, carrying a flue from the refining furnaces into the flues of a stream boiler to use the waste heat of the refinery, and make it available for generating steam for driving an engine.

Figure 1 is a a plan view; fig. 2 is a longitudinal elevation of two furnaces combined together and fitted up on these principles, with the refinery attached. Fig. 3 is a corresponding vertical section of the same.

The water is conducted to the furnace shell by the vertical pipes, A A, fig. 3, which are in communication with a water reservoir conveniently situated for that purpose. The water enters in a cold state into the water space, B, at the back of the flue jamb plates, C, as well as into the water space, D, behind the bridge jamb plates, E. From the space, B, the water passes into the water space, F, between the flue bridge plates, thence into space, G, set near the back wall plate of the furnace, and

Figure 2.



is finally discharged into the tank, H, under the bottom plates of the furnace. The water supplied to the space, D, passes to the space, I, between the fire-bridge plates, and thence into the space, J, near the back wall plates of the furnace. After passing through this course, the heated current is finally received as before, by the bottom tank, H. By this contrivance the whole of the parts exposed to the intense heat of the puddling process, are effectually kept cool, as the passing current of water surrounds every part of the containing shell, and carries off the excess heat, and the warm water can be used as the feed water for the steam engine, or for other purposes. The refinery into which the raw pig iron is put in a broken state for melting, is at K. It is supplied with air blown thrown the tuyeres, L, on two opposite sides in the usual way; and as the metal is melted and refined, it is run out direct into the two puddling furnaces by the inclined pipes or ducts, M M. In this way the metal is at once conveyed to the puddling hearths without any additional trouble. The two puddling furnaces are of the usual reverberating kind, and their grates, N, are supplied with coals in the usual manner, the iron being worked through a side opening, governed by a balanced sliding door, O. The flues from both furnaces pass into the central or intermediate chimney, P, carried on cast-iron framing. The entire furnace is encased in massive iron plates stayed together across the top transversely by tension rods; the fixed guide piece, Q, for operating the door is cast with side lugs, R, which fit into corresponding recesses cast on the main frame plates, a bolt being put through from the upper side, in each case, to bind the whole together. The combination of the refining with an elevated stalk is not represented; neither is the mode of conveying the excess of heat and applying it to a steam boiler; these arrangements and appendages will be easily understood. The application of the waste heated products from smelting furnaces has been applied to steam boilers for a long time, at some of the smelting works in Wales and in Germany, whether many of our iron manufacturing establishments use them or not we do not know—no one that we have visited do so. By the arrangements and construction of furnaces represented, the exposed parts of the furnace are prevented from being rapidly injured by the